

FIG. 1
(prior art)

FIG. 2 is a block diagram of a system for processing a statistically multiplexed multimedia stream. The system includes a QAM/DPSK modulator 130, a PID filter 140, a MPEG-2 decoder 170, a TV 135, a mass storage 160, and a single multimedia stream (e.g., HBO) 150. The QAM/DPSK modulator 130 receives a statistically multiplexed multimedia stream and outputs a stream of PIDs. The PID filter 140 filters the stream of PIDs to extract a single multimedia stream. The single multimedia stream is then processed by the MPEG-2 decoder 170 and the TV 135. The mass storage 160 is also connected to the MPEG-2 decoder 170.

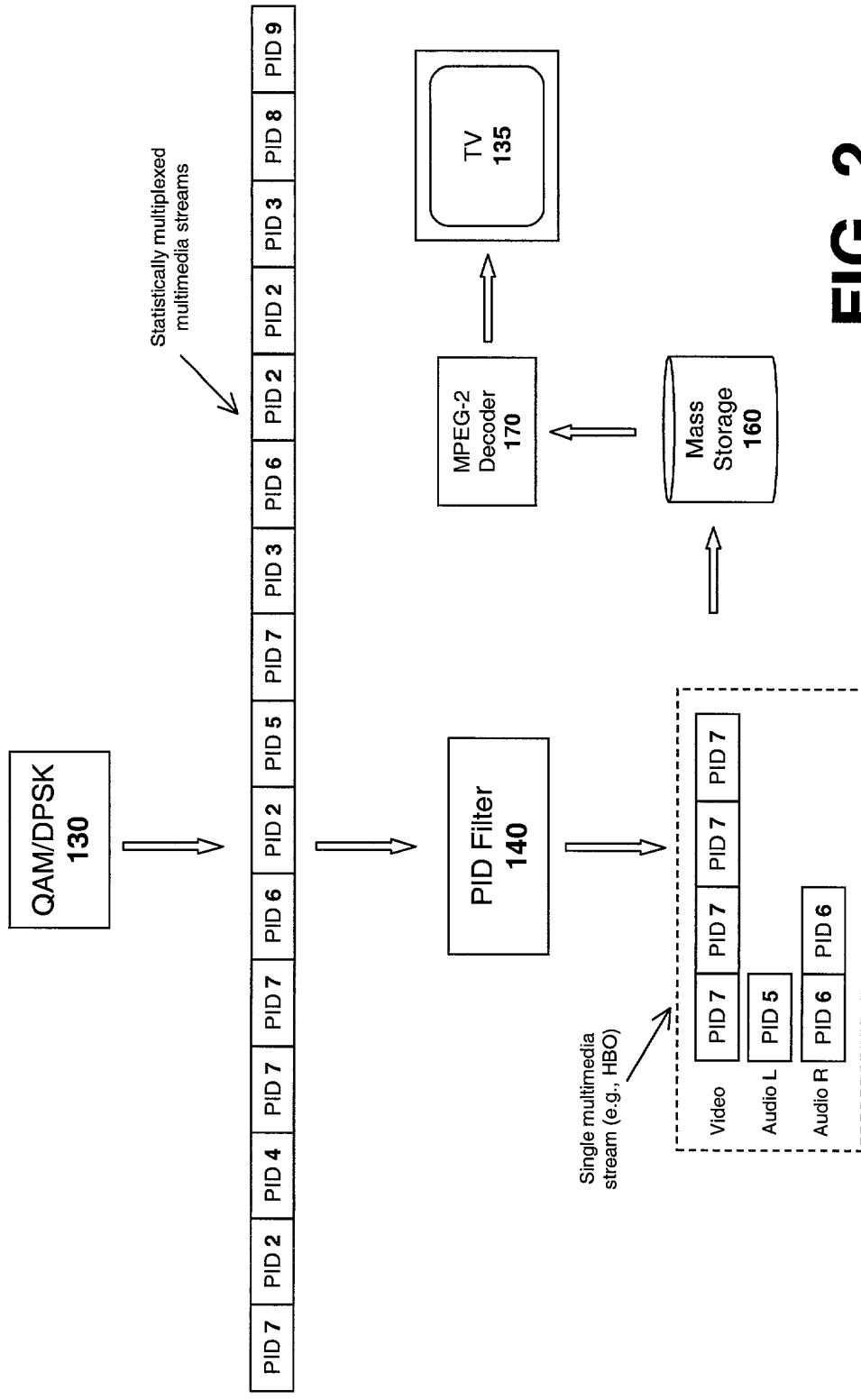


FIG. 2
(prior art)

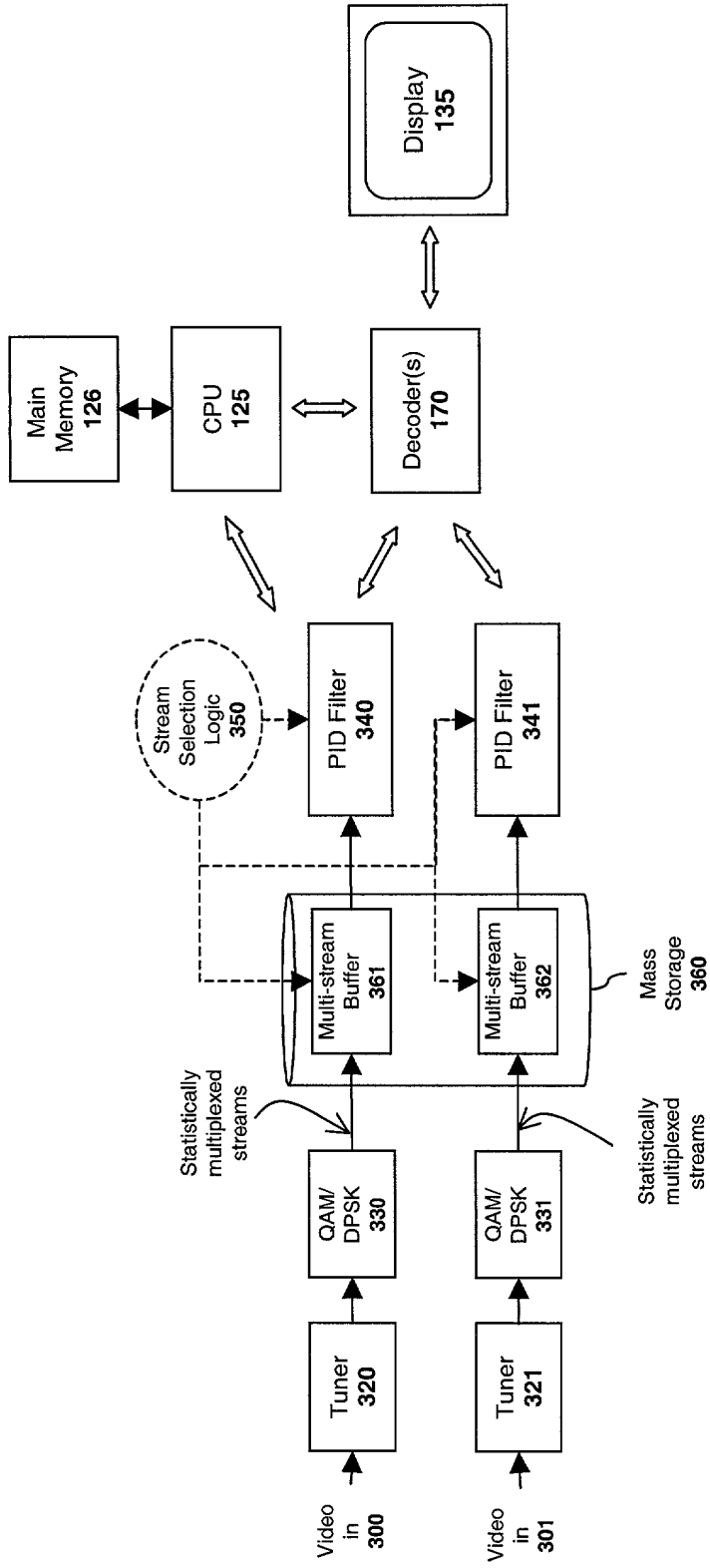


FIG. 3

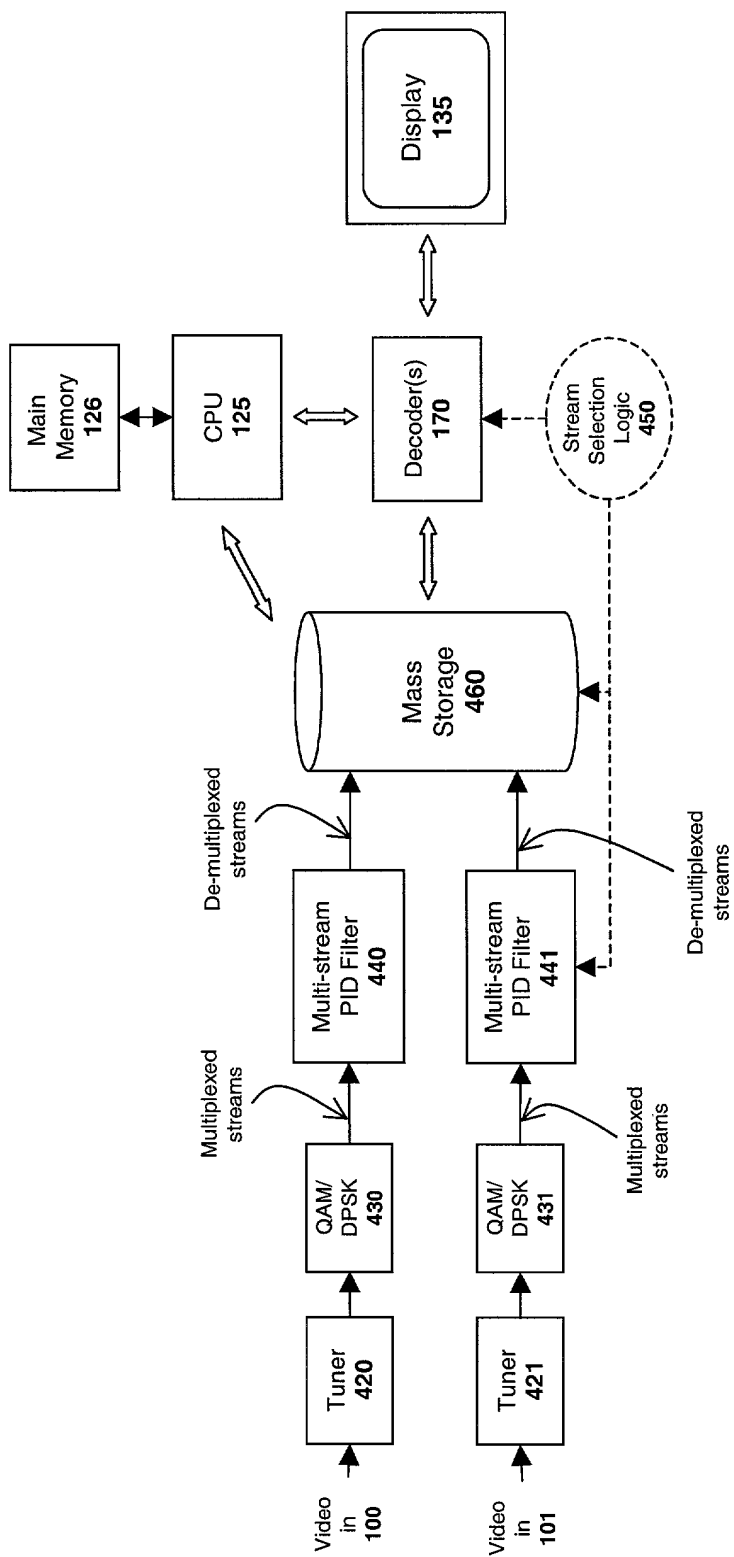


FIG. 4

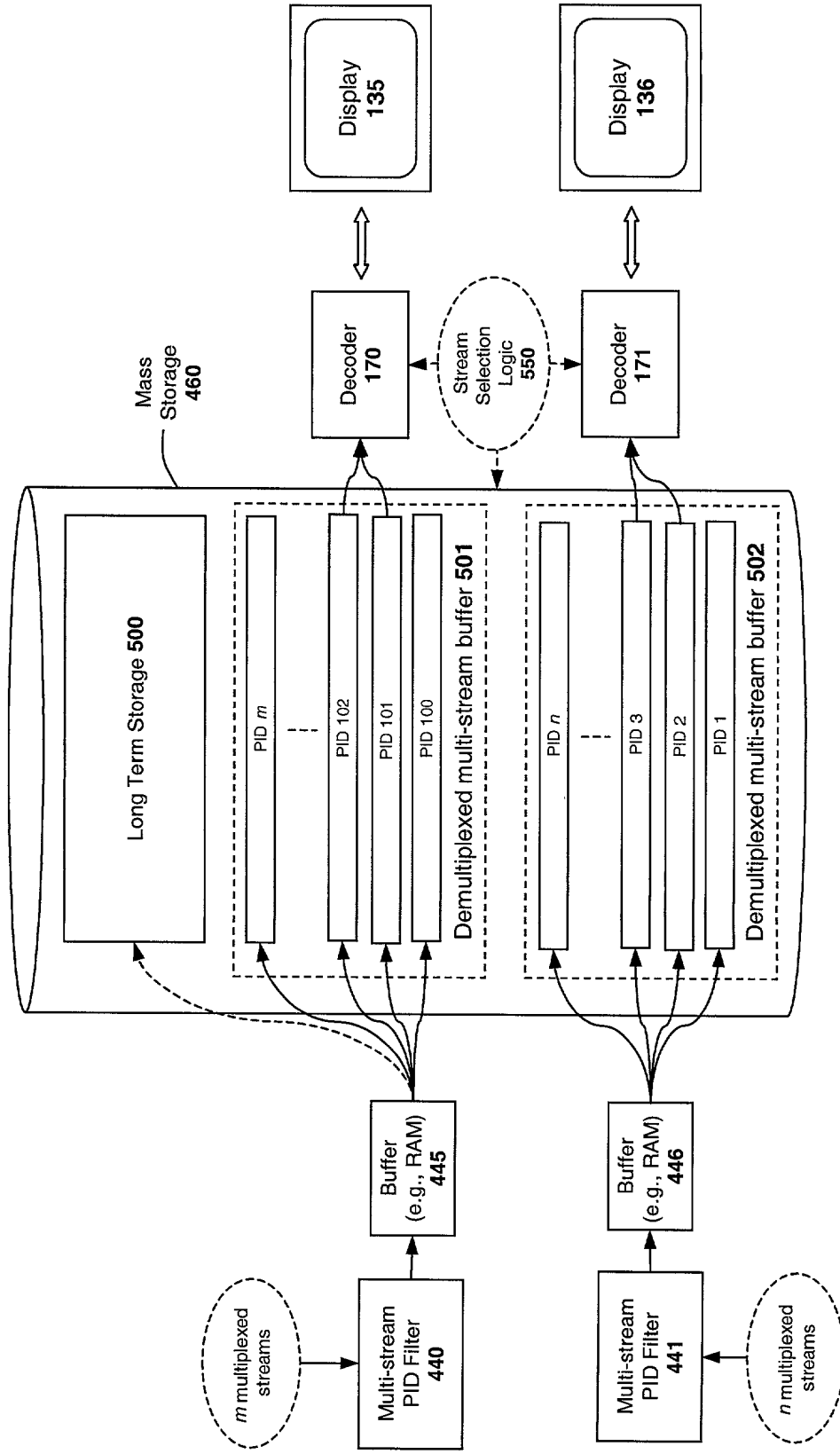


FIG. 5

Program Guide 600

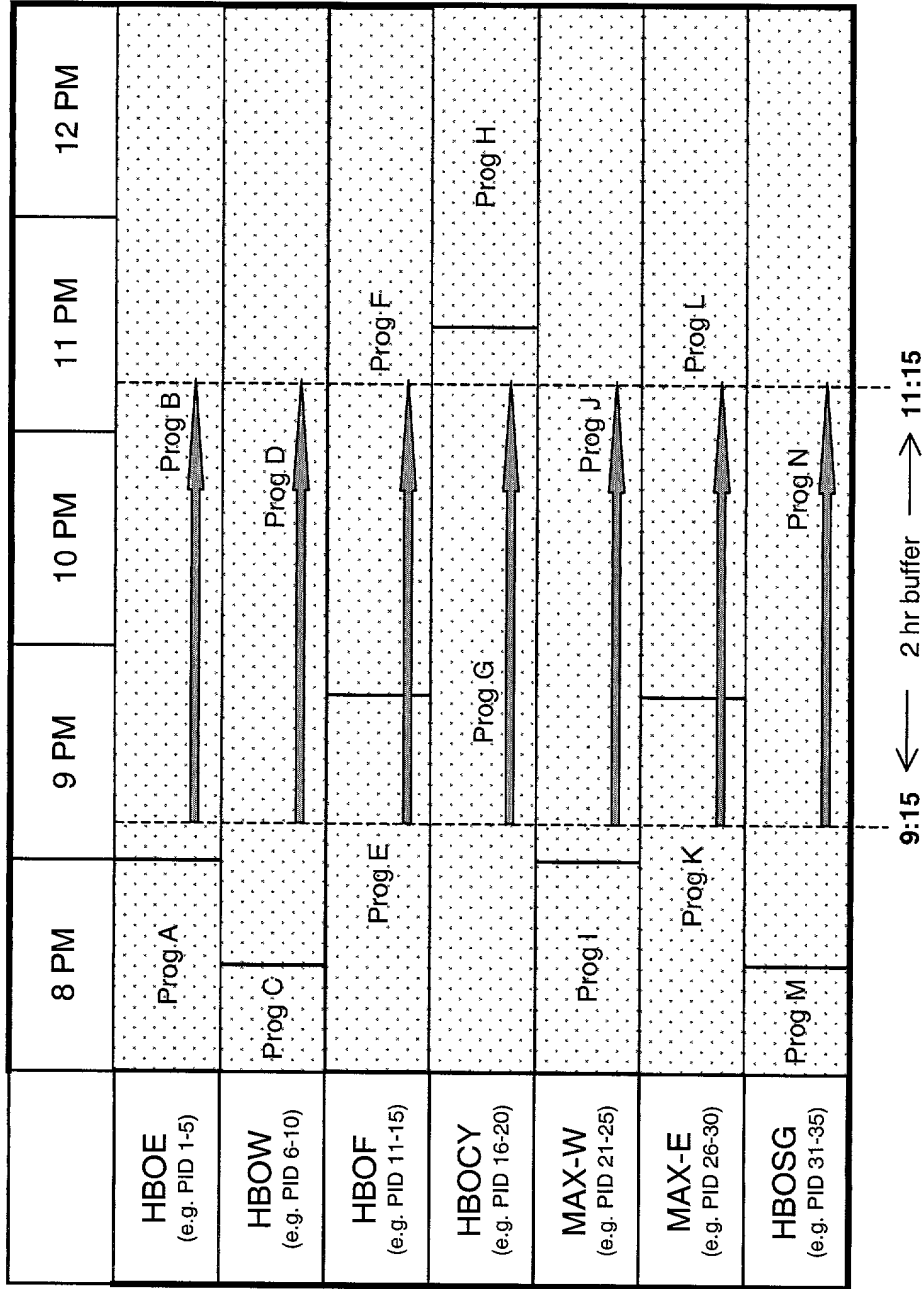


FIG. 6

Program Guide 500

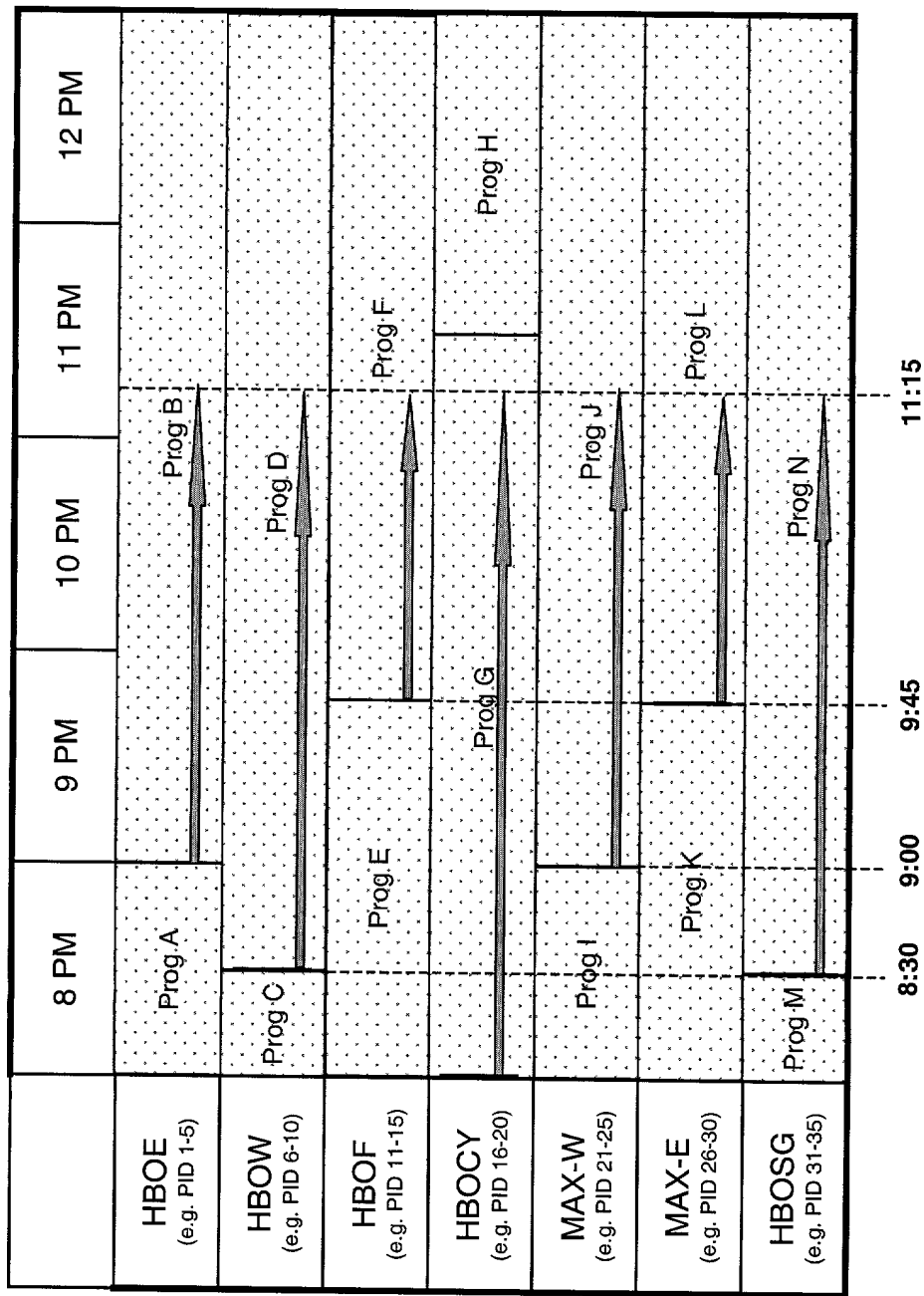


















FIG. 7

Current Programs			
Movies	Sports	News	Save This
<div>  <div>Information 801</div> </div> <div>  </div> <div>  </div> <div>  </div>	<div>  </div> <div>  </div> <div>  </div> <div>  </div>	<div>  </div> <div>  </div> <div>  </div> <div>  </div>	<input checked="" type="radio"/> <input checked="" type="radio"/> <input type="radio"/> <input type="radio"/>
TV Comedy	TV Drama	Selection Region 805	
<div>  </div> <div>  </div>	<div>  </div> <div>  </div>	<input checked="" type="radio"/> <input checked="" type="radio"/>	

Audio/Video 800

Highlight 803

FIG. 8

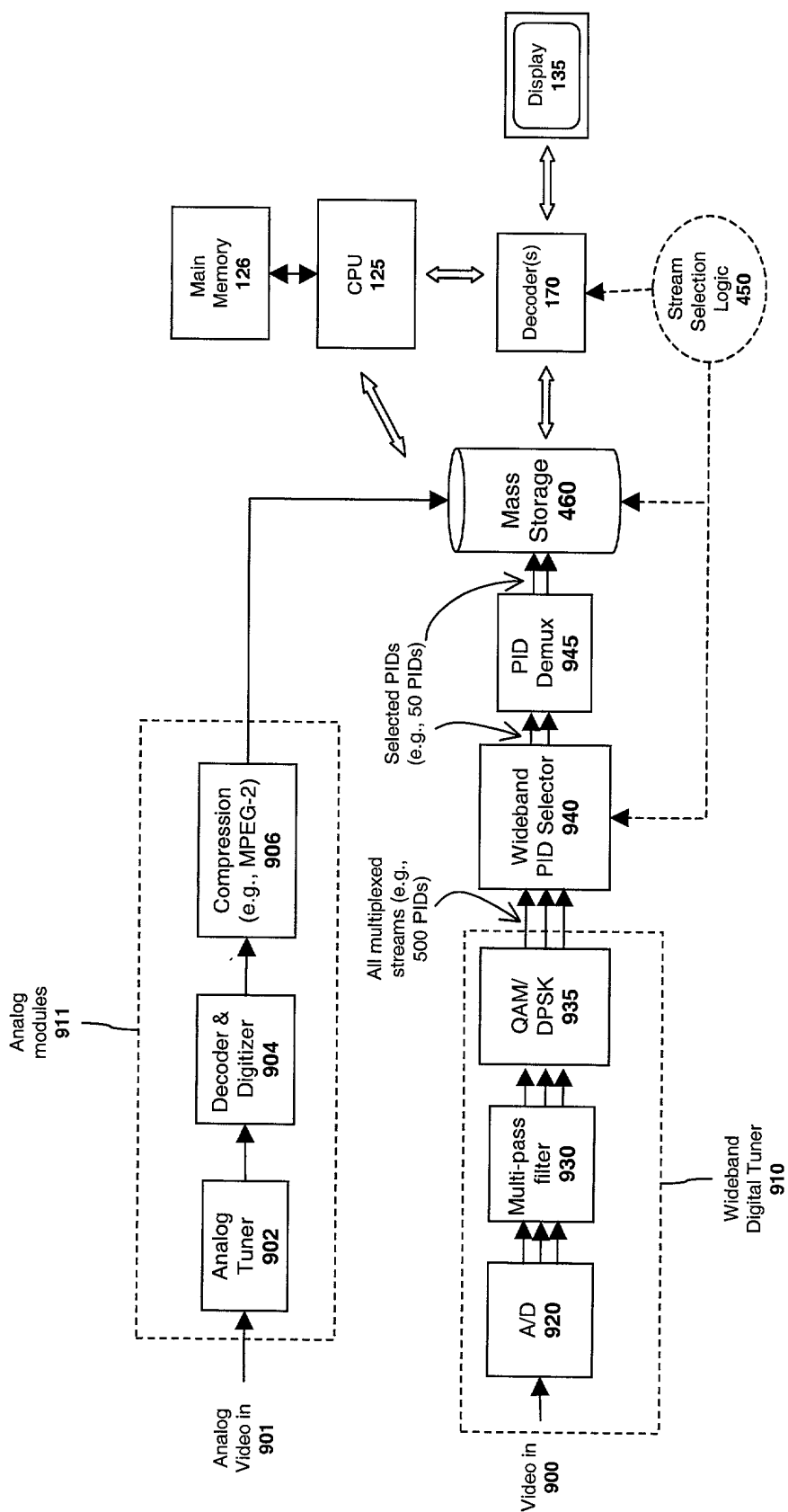


FIG. 9

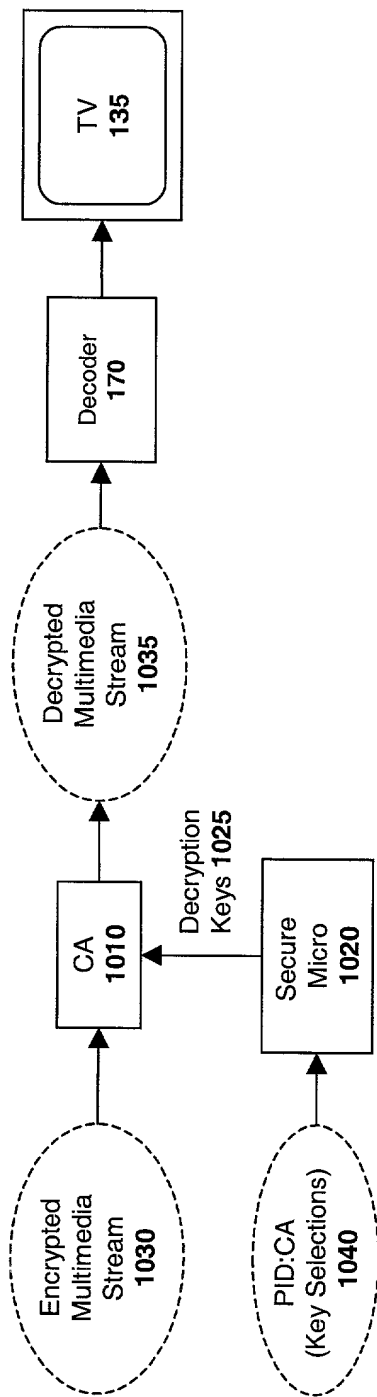


FIG. 10

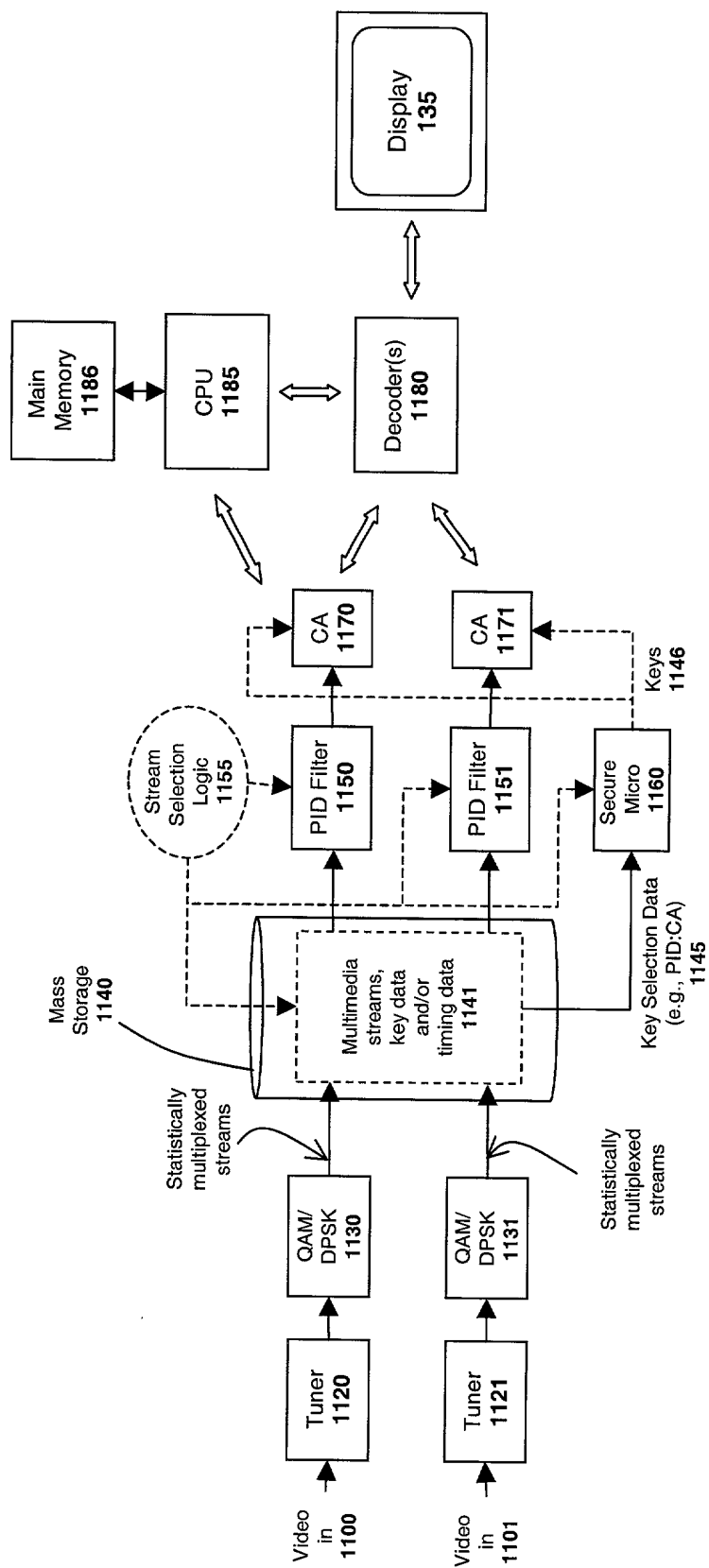


FIG. 11

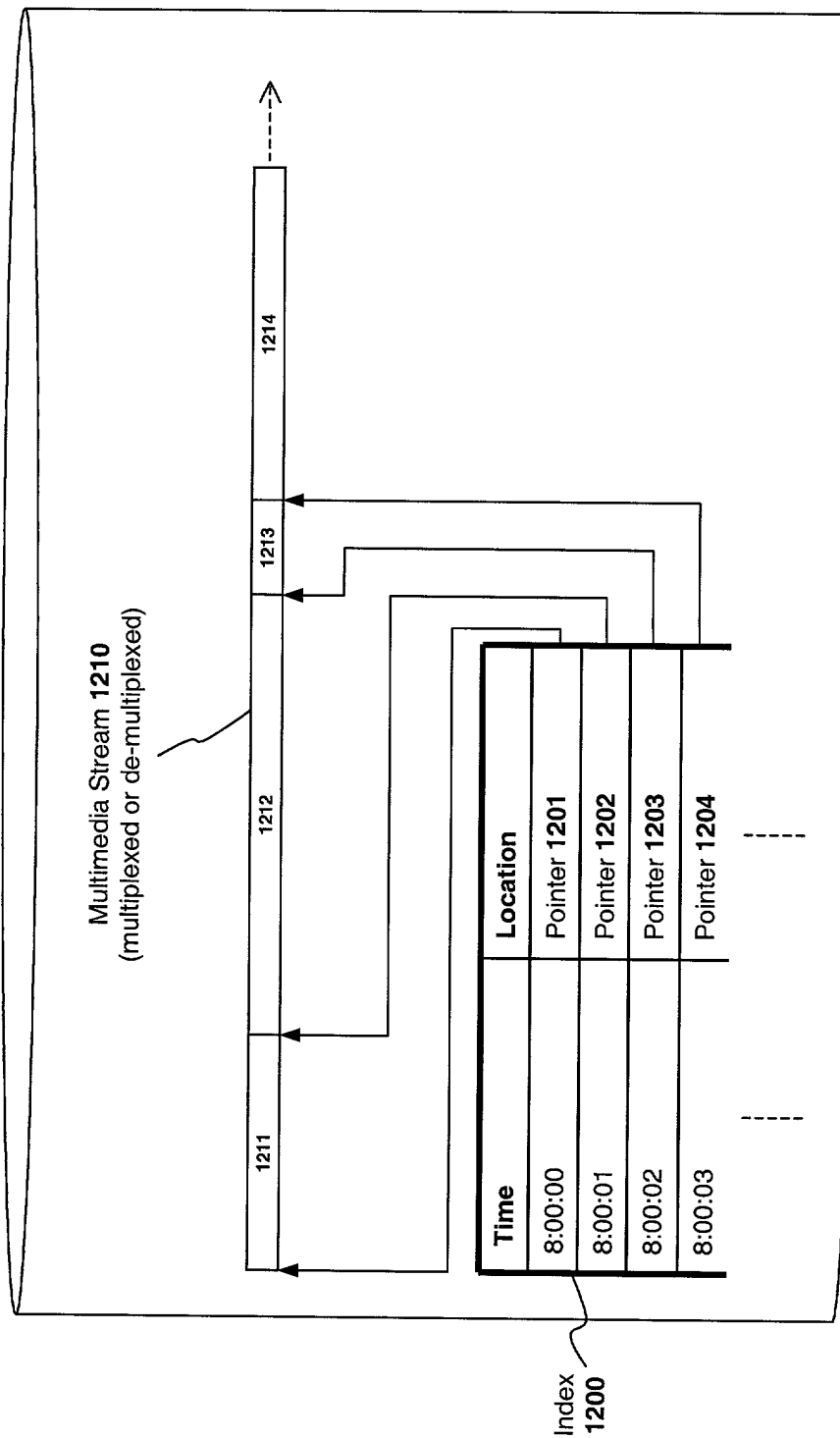


FIG. 12

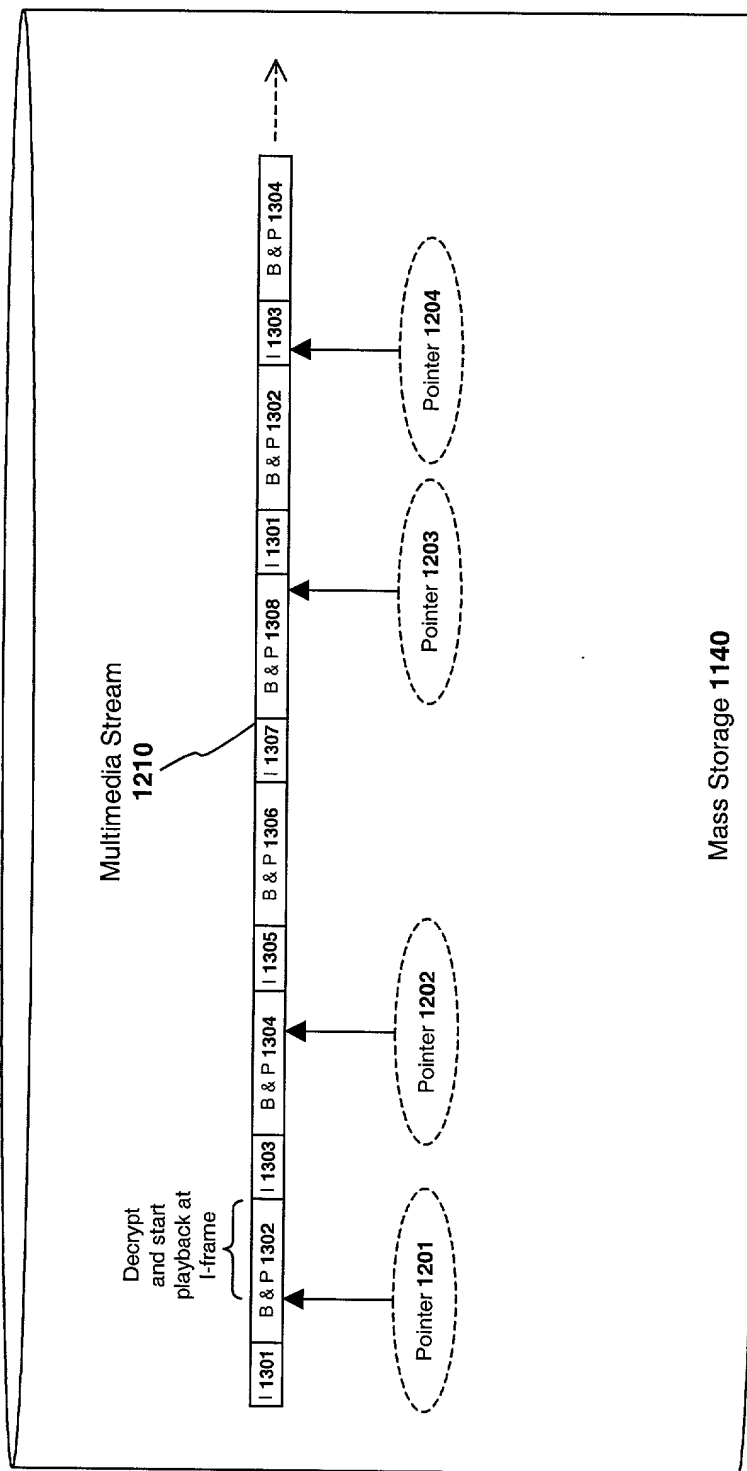


FIG. 14 is a block diagram of a memory structure 1140, showing a sequence of frames 1301 through 1304, each containing an I-frame and a B & P frame. The frames are connected by arrows indicating a sequence. A dashed arrow points to the right, indicating the sequence continues. A label 'Mass Storage 1140' is positioned below the sequence. A note 'Attempted jump from I-frame 1301 to 1303' points to the I-frame 1301, and a note 'Decrypt and start rendering at next I-frame' points to the I-frame 1303.

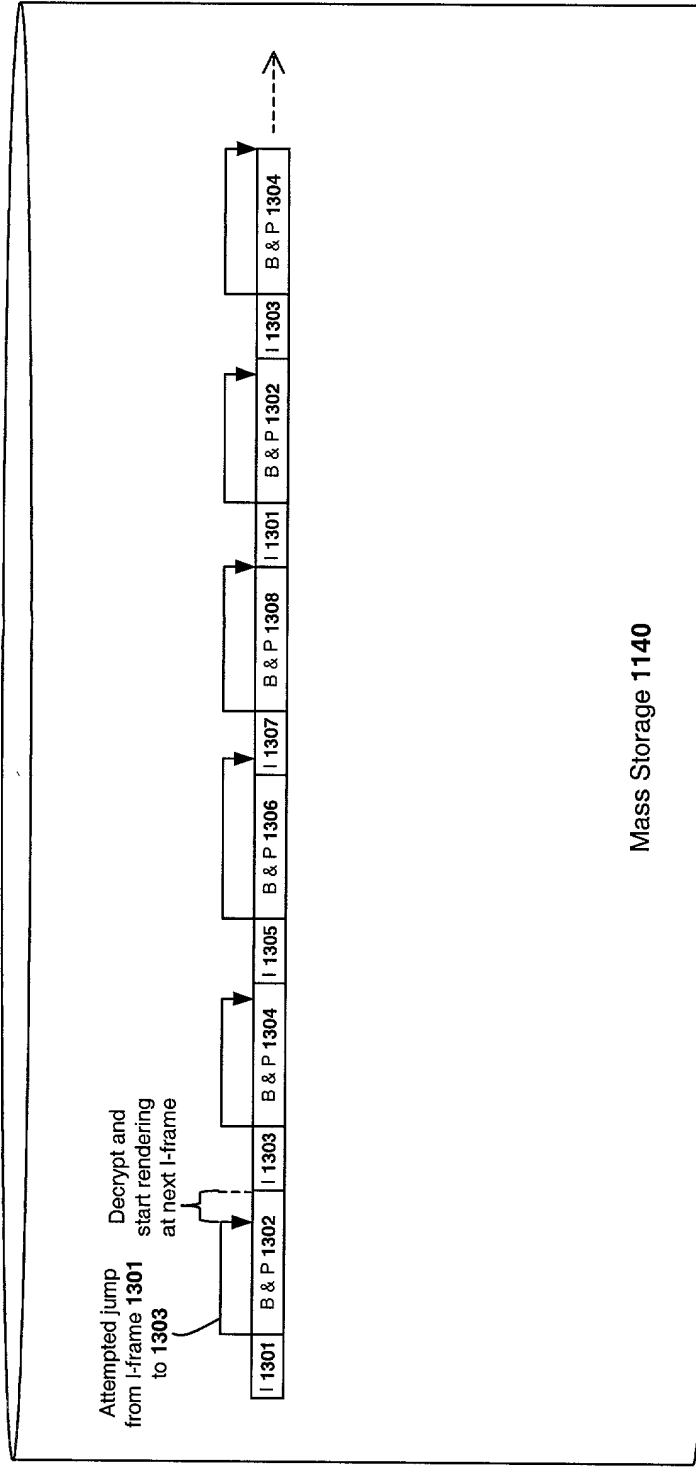


FIG. 14

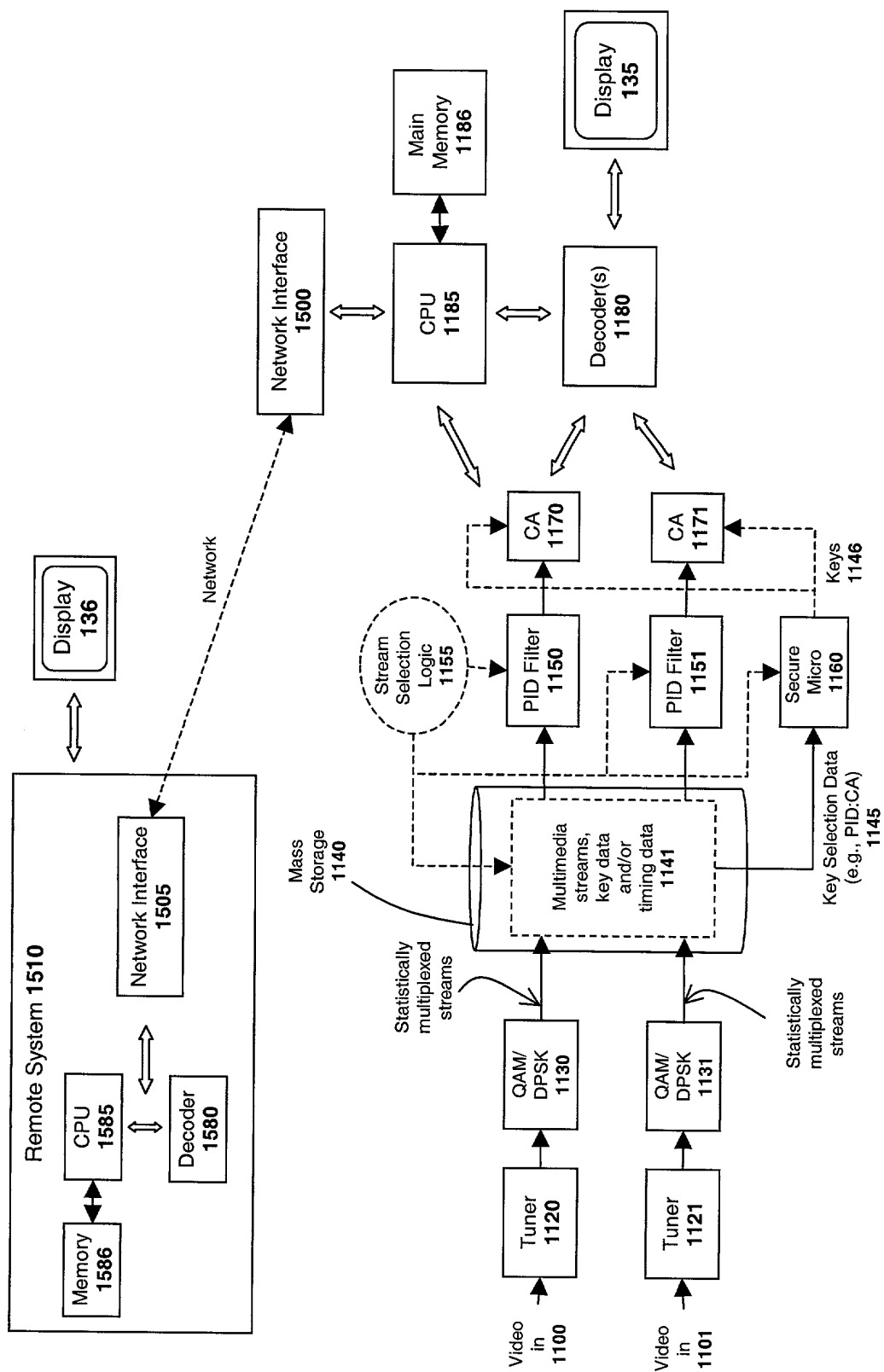


FIG. 15

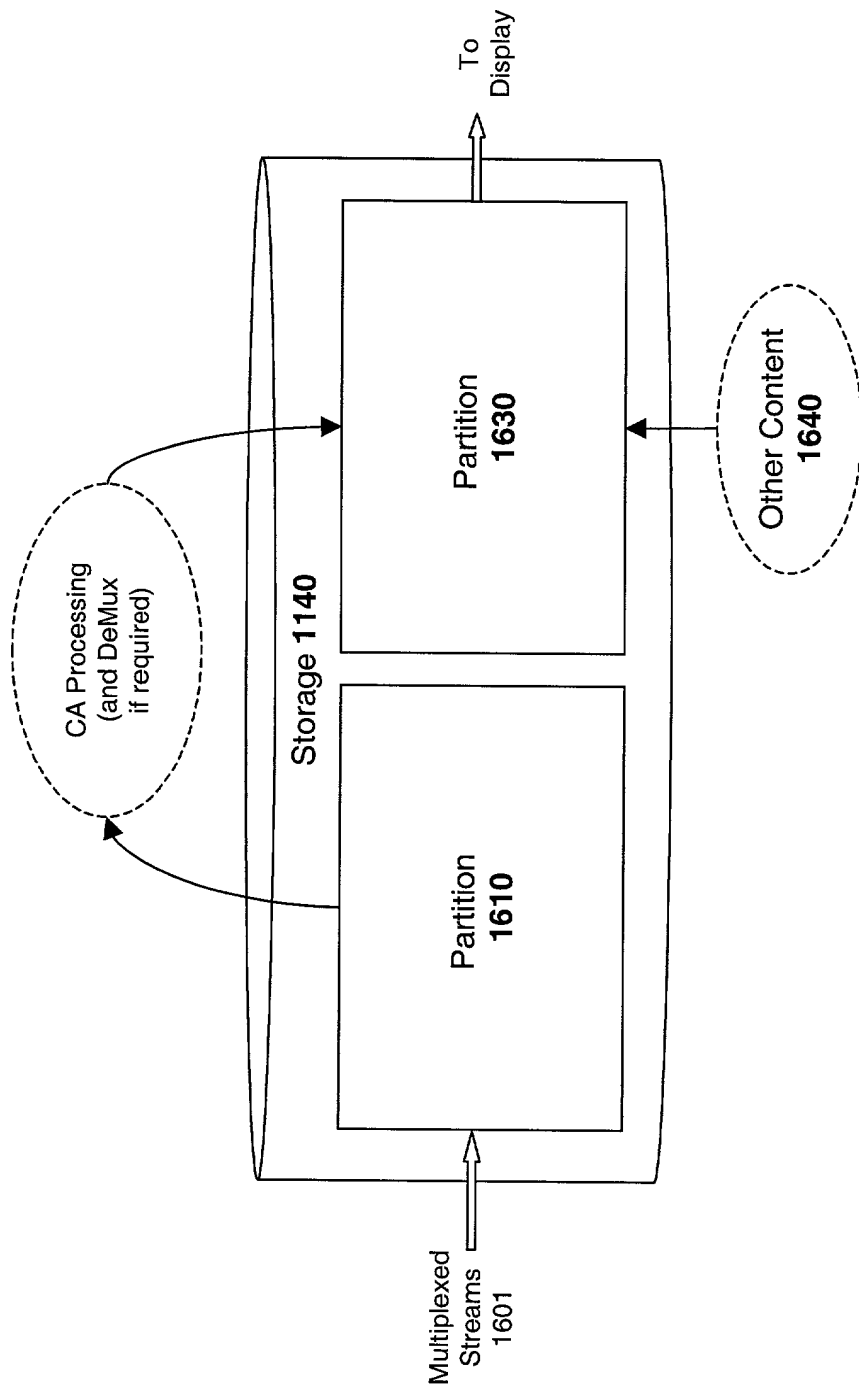


FIG. 16

FIG. 17 is a block diagram of a storage system architecture. The system includes a stack of components: Apps 1700, VFS 1710, File System 1720, and Block Device Drivers 1730. The VFS 1710 component is connected to a Cache 1715. The Block Device Drivers 1730 are connected to Storage 1140 via Disk I/O.

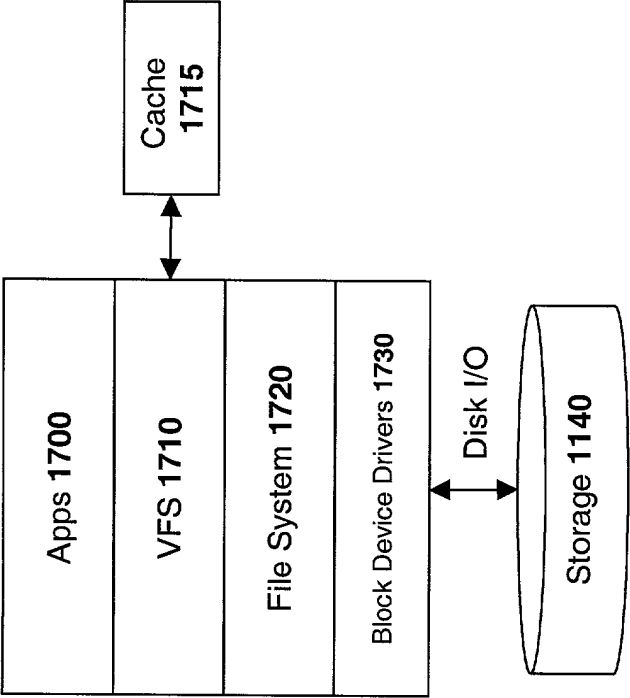


FIG. 17

FIG. 18a is a diagram illustrating a head seek pattern optimized for reading. The diagram shows a sequence of blocks (1800, 1801, 1802, 1803, 1804) and (1810, 1811, 1812, 1813, 1814) and (1820, 1821, 1822, 1823, 1824) and (1830, 1831, 1832, 1833, 1834) arranged in a grid. The blocks are grouped into four files (A, B, C, D). The head seek pattern is shown by arrows indicating the sequence of blocks read: 1800, 1801, 1802, 1803, 1804, 1810, 1811, 1812, 1813, 1814, 1820, 1821, 1822, 1823, 1824, 1830, 1831, 1832, 1833, 1834.

Head Seek Pattern Optimized for Reading

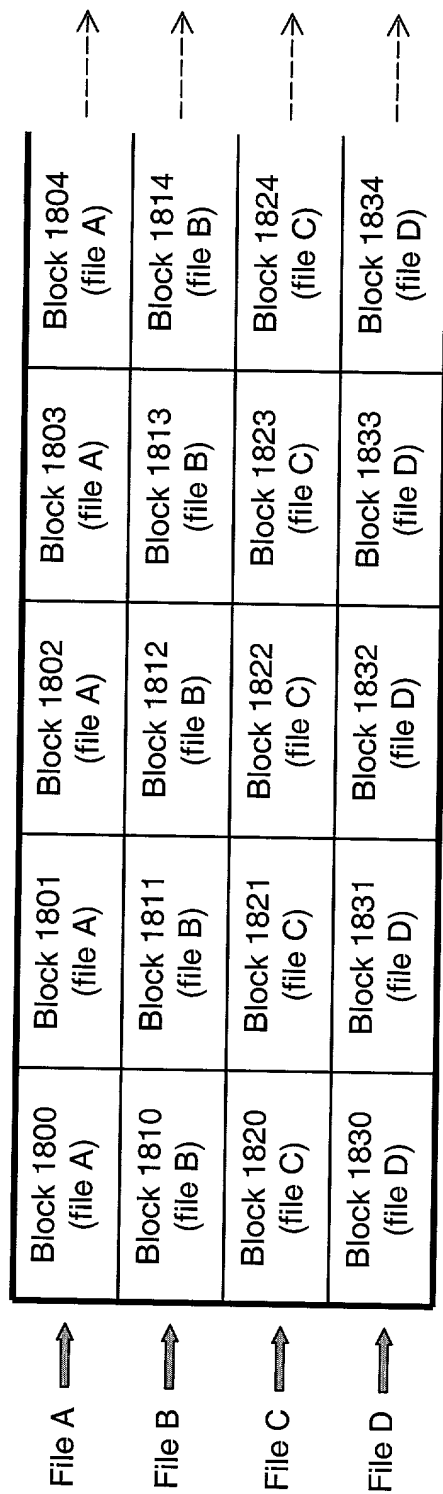


FIG. 18a

FIG. 18b is a diagram illustrating a head seek pattern optimized for writing. The diagram shows two vertical sequences of blocks, each containing ten blocks. The top sequence starts with Block 1800 (File A) and ends with Block 1809 (File B). The bottom sequence starts with Block 1810 (File C) and ends with Block 1819 (File D). A dashed arrow indicates the head seek pattern, starting from Block 1800, moving down to Block 1809, then jumping to Block 1810, and continuing down to Block 1819. The label 'Files A, B, C and D' is positioned to the left of the top sequence.

Files A, B,
C and D

Head Seek Pattern Optimized for Writing

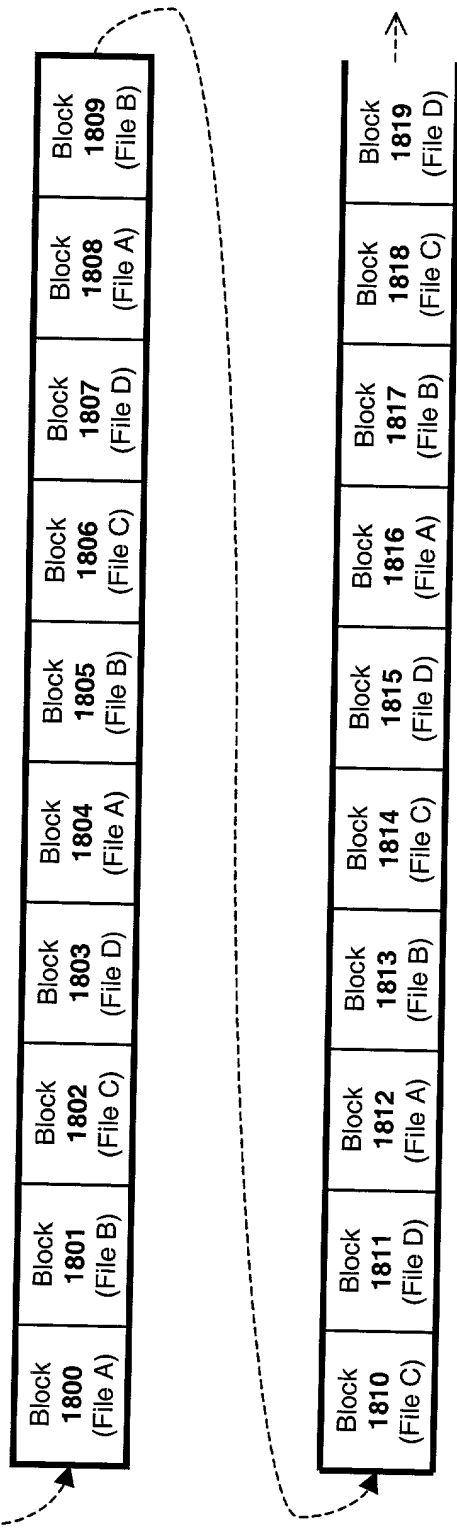


FIG. 18b

FIG. 19 is a block diagram of a system for allocating storage space to a data stream. The system includes a transport stream 1901, a de-multiplexer 1900, a block allocation unit 1910, an allocation policy 1920, and mass storage 1140. The transport stream 1901 is input to the de-multiplexer 1900. The de-multiplexer 1900 is connected to the block allocation unit 1910. The block allocation unit 1910 is connected to the allocation policy 1920. The allocation policy 1920 is connected to the block allocation unit 1910. The block allocation unit 1910 is connected to the mass storage 1140.

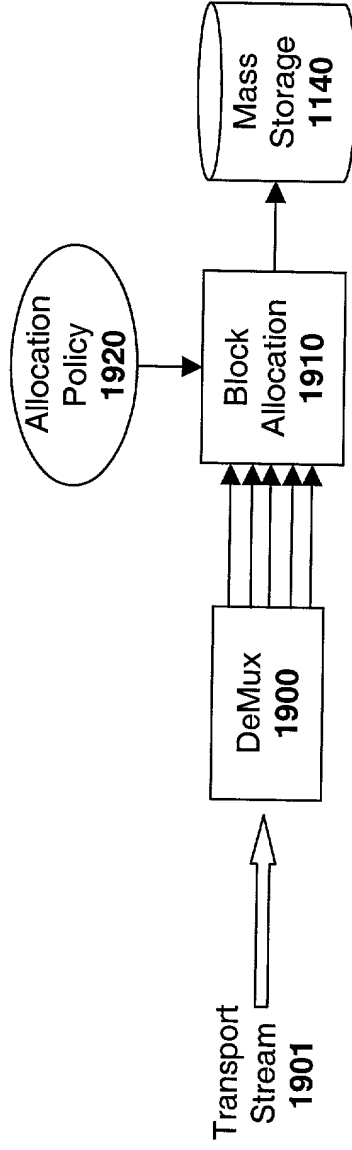


FIG. 19

FIG. 20 is a block diagram of a metadata structure. The diagram shows a hierarchy of blocks and data. At the top is the "I-Node 2010" block, which contains "12 ptrs to data", a "Ptr to indirect block", and a "Ptr to doubly-indirect block". Below the I-Node are three blocks: "Data 2020", "Indirect Block 2030 Ptrs to data", and "Doubly-Indirect Block 2050 Ptrs to indirect Blks". The "Indirect Block 2030" points to "Data 2040". The "Doubly-Indirect Block 2050" points to "Indirect Blocks 2060 Ptrs to Data", which in turn points to "Data 2070".

Metadata

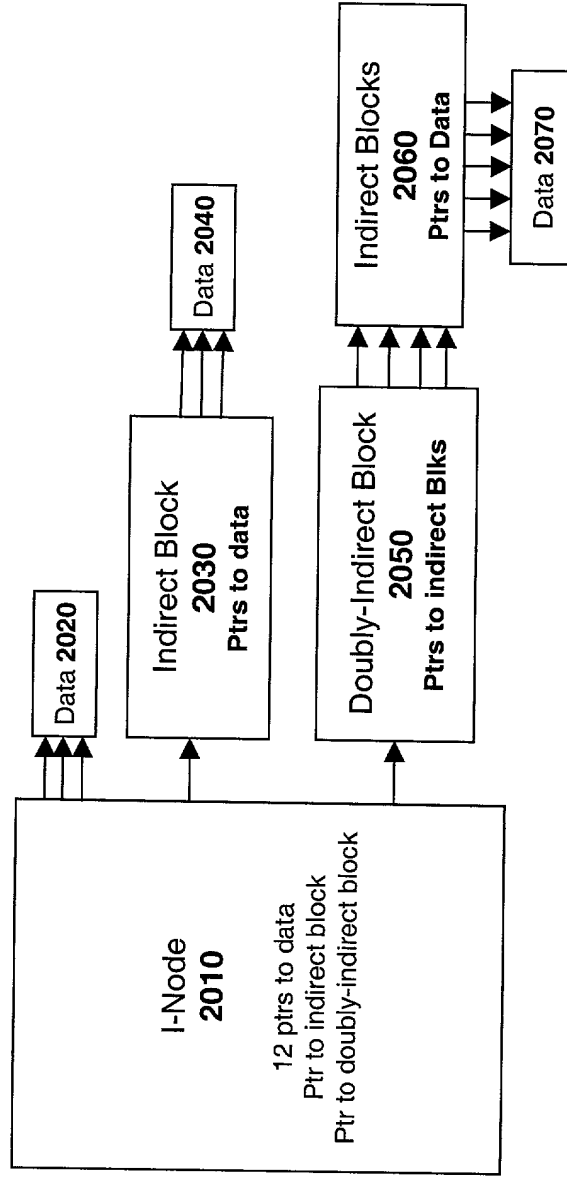


FIG. 20

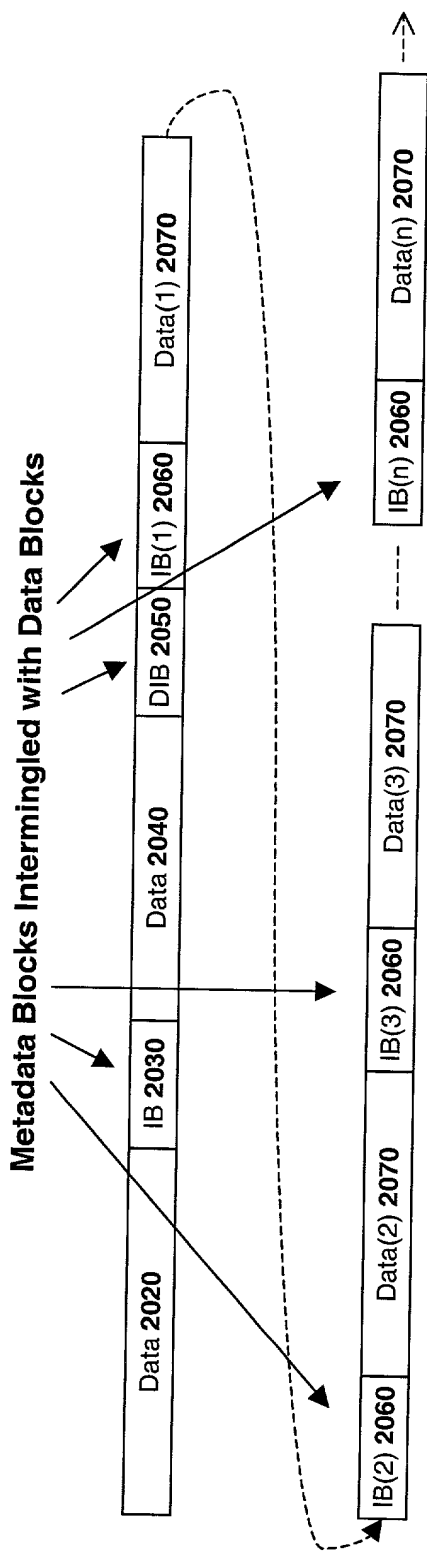


FIG. 21

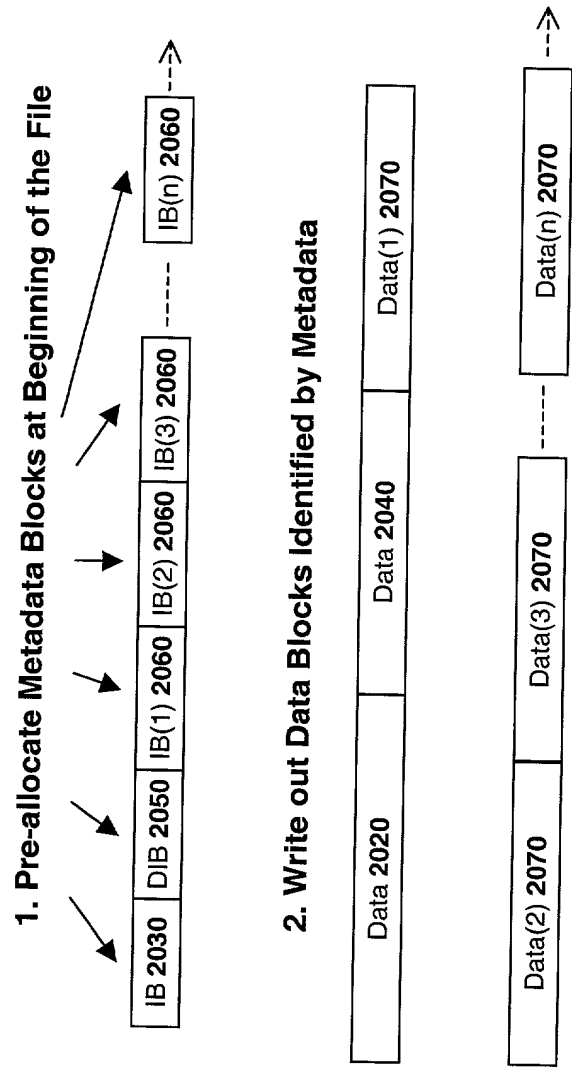


FIG. 22